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Aly is an implant dentist and clinical director at North Cardiff Dental & Implants. He is a graduate of Cardiff University and holds a diploma in implant dentistry from the Royal College of Surgeons of Edinburgh. His practice of dentistry is focused solely on the placement and restoration of dental implants.

ENHANCED CPD

GDC anticipated outcome: C

CPD hours: one

Topic: CBCT

Educational aims and objectives:

To explore the use of cone beam computerised tomography in implant dentistry to avoid possible surgical surprises. This article qualifies for one hour of enhanced CPD; answer the questions on page 116 or scan the QR code.



Some words just belong together – for example: moisture control and bonding; border moulding and dentures, and obturation and endodontics. Curettage and extractions, perhaps? How about cone beam computerised tomography (CBCT) and implants? Thankfully less frequently, dental infections and antibiotics.

Certain principles are tied to clinical procedures, drummed into clinicians all the way from the clinical years of undergraduate training – but perhaps not all of the necessary ones, and sometimes protocols go out of the window after our final exams.

Sticking to the rules isn't so easy when we have a population of real people to look after, with their lives and their problems and their pain all in your hands.

I'm always pleased to hear a patient say that the referring dentist left the tooth in situ as 'implant dentists prefer to take the tooth out themselves'.

More often, I hear about the multiple courses of antibiotics that were kindly provided to try to extend the life of teeth. And, increasingly from within the dental profession, I hear about the potential dangers of overusing CBCT.

I hope that sharing the following case will stimulate some discussion amongst our profession about the current trends and how we might consider these principles in the context of cases such as this one.

CASE STUDY

This female patient presented for a consultation to discuss replacing her UR2 with an implant. It had been six months since the root had been removed by her dentist after the post crown had failed.

The extraction was preceded by four courses of antibiotics in the previous 12 months to treat the recurrent buccal swellings. This cycle was ended by the prosthetic tooth debonding, revealing a fractured root that could no longer be restored.



FIGURE 1: Initial situation



FIGURE 2: Intraoral view of initial situation

The patient didn't like wearing a removable denture and decided that it was time to explore the options. Clinically, the appearance of the tissues and the ridge form were good, suggesting no signs of underlying defects (Figures 1 and 2).

THE KNOWN UNKNOWNNS

An ultra-low dose sectional CBCT was taken, which revealed a large bony defect. The radiolucency was seen to breach the palatal wall, extend to within 3mm of the floor of the nose and distally undermine the canine root.

Despite coming very close to the root of the tooth, the canine remained vital. Figures 3a, 3b and 3c show the axial, sagittal and coronal views.

Aly Virani presents an implant case that highlights the current antibiotic prescribing trend and the importance of the appropriate use of CBCT

Avoiding surgical surprises



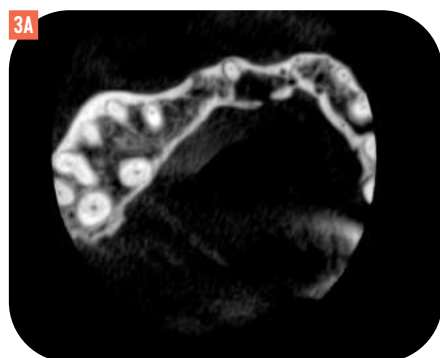


FIGURE 3A: Radiograph, axial view

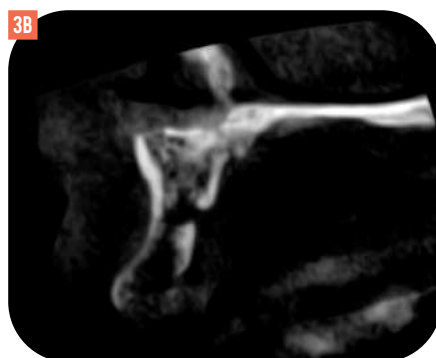


FIGURE 3B: Radiograph, sagittal view



FIGURE 3C: Radiograph, coronal view



FIGURE 4: Treatment plan for implant placement

The treatment plan, which was agreed with the patient, was to degranulate the defect, place a 15mm length implant to engage the healthy bone overlying the floor of the nose and graft the defects using synthetic materials (Figure 4).

SEEING IS BELIEVING

Once a papillae-sparing full thickness muco-periosteal flap was raised, the site was thoroughly degranulated using a combination of degranulation burs and curettes (Figure 5).

Ultimately, the egg-shell thin buccal wall was compromised, allowing better access to the rest of the defect (Figures 6 and 7).

The root of the canine was visible inside the defect, but the apex remained embedded in healthy bone.

Platelet-rich fibrin (PRF) was inserted into the socket palatally before a Southern Implants Co-Axis deep conical connection tapered implant was inserted with low insertion torque (Figure 8). This implant has a 12° angled screw channel to mimic the anatomy of a natural incisor. This allows for the implant to be inserted into the alveolar bone parallel to the bony envelope but

also be restored with a straight screw retained crown.

The buccal defect and the jump-gap that resulted from the degranulation were grafted with beta-tricalcium phosphate synthetic grafting material (Powerbone Putty, Terramed) (Figure 9).

The remaining bone structure meant that there was no need for guided bone regeneration (GBR) beyond the existing bony envelope and the contained defects were well supported (Figure 10).

PANDEMIC ANTIBIOTICS

After many years of successfully decreasing the dependence of the profession (and, more importantly, the expectations of the public) for antibiotics as treatment for dental infections, the COVID-19 pandemic protocols have seemingly undone much of this.

Unfortunately, we are likely to continue to see the effects of palliative antibiotic use on the size and effect of bony defects – and perhaps eventual involvement of neighbouring teeth – in the years to come following the COVID-19 pandemic.

Raising public awareness of the long-term effects of such prescribing may help to decrease the pressure on colleagues working in primary care.

Losing teeth at an appropriate stage could save the patient from more invasive surgery, complications with other teeth, financial implications of grafting and more predictable implant treatment.

DEGRANULATION

Thorough degranulation is a cornerstone of implant dentistry. Failures early on in the careers of many implant dentists can often be traced back to less than thorough curettage and degranulation of infected sockets.

The correct combination of instruments, technique, patience and access are vital – especially when planning for immediate implant placement. However, even some rudimentary degranulation can make a difference to the quality of regenerated tissues.

Perhaps the concept of degranulation should be introduced as part of the undergraduate curriculum? This is especially important in a world where implants are becoming a more commonly sought option to replace teeth.

JUSTIFICATIONS

American politician Donald Rumsfeld stated: ‘Reports that say that something hasn’t happened are always interesting to me, because as we know, there are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know.

‘But there are also unknown unknowns – the ones we don’t know we don’t know. And if one looks throughout the history of our country and other free countries, it is the latter category that tends to be the difficult ones.’

The information we can gain from CBCT used to be an ‘unknown unknown’, but there are now plenty of studies that reveal the differences in diagnostic yield between two- and three-



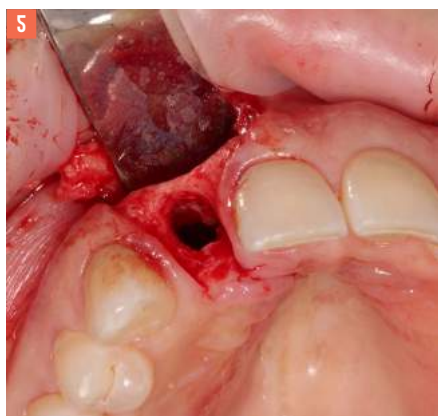


FIGURE 5: The site was degranulated



FIGURES 6 and 7: The buccal wall was compromised



FIGURE 8: The implant was inserted with low insertion torque



FIGURE 9: The buccal defect and jump-gap that resulted from the degranulation were grafted with synthetic grafting material



FIGURE 10: Sutures placed – there was no need for guided bone regeneration beyond the existing bony envelope and the contained defects were well supported

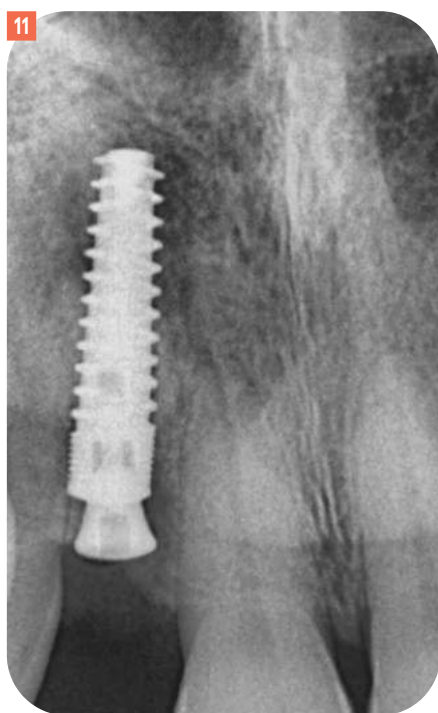


FIGURE 11: Postoperative radiograph

dimensional radiography – yield that changes treatment plans and validates consent.

Modern CBCT, such as the one used for these images (Plameca Promax 3D), use ultra-low doses of radiation to provide huge diagnostic yield. So, if we aren't using CBCT, we are aware of the information that we might be missing – making these 'known unknowns'.

Clinical doubt over the shape of the alveolar ridge is on the list of justifications for limited volume CBCT in the FGDP's *Selection Criteria for Dental Radiography Guidelines*. Cases like this highlight why clinical information is a poor indicator of anatomy and why we should embrace this technology rather than vilify it.

Modern CBCT has a radiation dose comparable to older OPG units (21µSv versus 17.6µSv). To put this not context, someone who smokes a pack and a half of cigarettes daily, eats a banana every day and flies six hours a week in an aeroplane is averaging the equivalent radiation of five CBCT scans per day – without a diagnostic yield and without consenting to the exposure.

CONCLUSION

A combination of a few changes in our practice could have a great positive impact on patients. Treating the cause of infections and degranulating extraction sockets could reduce the number of cases like the one presented.

The use of CBCT, where indicated, could help with planning access to such lesions and avoid any surgical surprises. [CD](#)

FURTHER READING

Horner K, Eaton KA eds (2018) *Selection criteria for dental radiography guidelines 3rd ed.* Faculty of General Dental Practice (UK), London: 92

PRODUCTS USED

Co-Axis Southern Implants
Powerbone Putty Terramed
Promax 3D Plameca